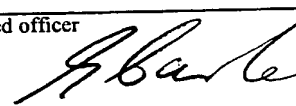


# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU 99/00836

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>																						
Int Cl <sup>6</sup> : B01D 1/00, B04C 9/00																						
According to International Patent Classification (IPC) or to both national classification and IPC																						
<b>B. FIELDS SEARCHED</b>																						
Minimum documentation searched (classification system followed by classification symbols) B01D 1/00, B04C 9/00																						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU IPC as above																						
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) W.PAT. B01D 1/00 + SWIRL OR VORTEX ORCYCLON: or hydrocyclon: B04C 9/00 and EVAPORAT:																						
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
X	US 4668441 A (26 May 1987) Hess	1-28																				
X	GB 2268418 A (12 January 1994) Howard	1-28																				
X	EP 873773 A (22 April 1998) Nishi	1-28																				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input type="checkbox"/> See patent family annex																						
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A"</td> <td>Document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E"</td> <td>earlier application or patent but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&amp;"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	Document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family																			
"P"	document published prior to the international filing date but later than the priority date claimed																					
Date of the actual completion of the international search 19 October 1999		Date of mailing of the international search report 25 OCT 1999																				
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No.: (02) 6285 3929		Authorized officer  G. CARTER Telephone No.: (02) 6283 2154																				

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00836

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Derwent Abstract Accession No 88-196735/28 Class P41 SU 1360807 (GOPO POLY ) 23 December 1987	1-28
X	EP 747102 A (11 December 1996) Kenton	1-28

## P. ENT COOPERATION TREA

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing</b> (day/month/year) 17 May 2000 (17.05.00)	
<b>International application No.</b> PCT/AU99/00836	<b>Applicant's or agent's file reference</b> FP11537
<b>International filing date</b> (day/month/year) 30 September 1999 (30.09.99)	<b>Priority date</b> (day/month/year) 30 September 1998 (30.09.98)
<b>Applicant</b> CLARKE, Neville et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
17 April 2000 (17.04.00)

☐ in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Claudio Borton Telephone No.: (41-22) 338.83.38
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**TENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

REC'D 13 FEB 2001

WIPO PCT

Applicant's or agent's file reference FP11537	<b>FOR FURTHER ACTION -</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).	
International Application No. PCT/AU99/00836	International Filing Date (day/month/year) 30 September 1999	Priority Date (day/month/year) 30 September 1998
International Patent Classification (IPC) or national classification and IPC Int. Cl. <sup>7</sup> B01D1/00;B04C9/00		
Applicant ALCOS TECHNOLOGIES PTY LTD et al		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.																								
2.	This REPORT consists of a total of 3 sheets, including this cover sheet. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of 2 sheet(s).																								
3.	This report contains indications relating to the following items: <table border="0"><tr><td>I</td><td><input checked="" type="checkbox"/></td><td>Basis of the report</td></tr><tr><td>II</td><td><input type="checkbox"/></td><td>Priority</td></tr><tr><td>III</td><td><input type="checkbox"/></td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr><tr><td>IV</td><td><input type="checkbox"/></td><td>Lack of unity of invention</td></tr><tr><td>V</td><td><input checked="" type="checkbox"/></td><td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td></tr><tr><td>VI</td><td><input type="checkbox"/></td><td>Certain documents cited</td></tr><tr><td>VII</td><td><input type="checkbox"/></td><td>Certain defects in the international application</td></tr><tr><td>VIII</td><td><input type="checkbox"/></td><td>Certain observations on the international application</td></tr></table>	I	<input checked="" type="checkbox"/>	Basis of the report	II	<input type="checkbox"/>	Priority	III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	IV	<input type="checkbox"/>	Lack of unity of invention	V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	VI	<input type="checkbox"/>	Certain documents cited	VII	<input type="checkbox"/>	Certain defects in the international application	VIII	<input type="checkbox"/>	Certain observations on the international application
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II	<input type="checkbox"/>	Priority																							
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VII	<input type="checkbox"/>	Certain defects in the international application																							
VIII	<input type="checkbox"/>	Certain observations on the international application																							

Date of submission of the demand 17 April 2000	Date of completion of the report 30 January 2001
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  G. Carter Telephone No. (02) 6283

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed.
- ☒ the description, pages 1-24, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☒ the claims, pages 26-29, as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 25-25a, received on with the letter of 08 January 2001
- ☒ the drawings, pages 1-4, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, was on the basis of the sequence listing:**

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims 1-28	<b>YES</b>
	Claims	<b>NO</b>
Inventive step (IS)	Claims 1-28	<b>YES</b>
	Claims	<b>NO</b>
Industrial applicability (IA)	Claims 1-28	<b>YES</b>
	Claims	<b>NO</b>

**2. Citations and explanations (Rule 70.7)**

None of the citations raised in the International Search disclose a cyclonic evaporator in which the components are subjected to partial flash vaporisation on being discharged from the hydrocyclone section into the evaporator section which partially separates them into at least two streams.

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1. A cyclonic evaporator for separating two or more components of a feed material prior to or simultaneously with at least partially vaporising one of the components, said cyclonic evaporator including a first portion in the form of a hydrocyclone and a second portion in the form of an evaporator, said hydrocyclone having at least one inlet located at or towards one side of the hydrocyclone for admitting feed material containing the at least two components to the hydrocyclone in a direction substantially tangential to the centre line of the apparatus; a means for imparting a swirling motion to the feed material about the centre line of the apparatus to at least partially separate the at least two components of the feed material from each other, and an outlet located at or towards one end of the hydrocyclone in a substantially axial direction to the side wall of the hydrocyclone for discharging the at least two components from the hydrocyclone in a swirling motion axially in a direction substantially parallel to the centre line of the apparatus wherein at least one of the components of the feed material is subjected to at least partial flash vaporisation on being discharged from the outlet to further assist in separating the two components from each other so that the components are discharged from the hydrocyclone into the evaporator at least partially separated into at least two streams

2. A method of separating one component from another component of a feed material, including admitting the feed material containing the two components to a hydrocyclone forming one part of the apparatus to impart a swirling motion to the feed material for at least partially separating the components from each other and to enhance the vaporisation of one of the components, vaporising at

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AMENDED SHEET  
IPEA/AU  
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least part of the one component, separating the one  
component from the other component by the one component  
having a tendency to remain as a vapour in the apparatus  
whereas the other component has a tendency or propensity  
5 to be condensable to a liquid in the apparatus, and  
discharging the one and the other components from the  
apparatus in at least partially separated streams whereby  
separation of the two components is substantially  
maintained, wherein one of the components of the feed  
10 material undergoes at least partial flash vaporisation on  
emerging from the hydrocyclone.

3. An apparatus or method of any preceding claim in  
which the feed material is an aqueous waste material or an  
15 organic solvent based waste material.